$$\frac{5431950}{1874161} = \left(-5x^2-27x\right)\left(1+\left(\frac{125}{1369}x + \frac{905325}{1874161}\right)\left(\frac{1}{5}x - \frac{47}{25}\right)\right) + \left(x^3-4x^2+4x+6\right)\left(\frac{125}{1369}x + \frac{905325}{1874161}\right)$$

Rearranging ① and substituting

$$\frac{5431950}{1874161} = \overbrace{\left(x^4-3x^3-5x^2-17x+6\right)}^{f(x)}\left(1+\left(\frac{125}{1369}x + \frac{905325}{1874161}\right)\left(\frac{1}{5}x - \frac{47}{25}\right)\right)$$
$$+ \overbrace{\left(x^3-4x^2+4x+6\right)}^{g(x)}\left(\left(\frac{125}{1369}x + \frac{905325}{1874161}\right) - (x+1)\left(1+\left(\frac{125}{1369}x + \frac{905325}{1874161}\right)\left(\frac{1}{5}x - \frac{47}{25}\right)\right)\right)$$

The multiplicative inverse is the coefficient of $g(x) = x^3-4x^2+4x+6$. Thus the multiplicative inverse is:

$$\left(\frac{125}{1369}x + \frac{905325}{1874161}\right) - (x+1)\left(1+\left(\frac{125}{1369}x + \frac{905325}{1874161}\right)\left(\frac{1}{5}x - \frac{47}{25}\right)\right)$$